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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/817,381

04/01/2004

Yongli Huang

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PERKINS COIE LLP

P.O. BOX 2168

MENLO PARK, CA 94026

EXAMINER

JAWORSKI, FRANCIS J

ART UNIT

PAPER NUMBER

3768

MAIL DATE

DELIVERY MODE

11/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/817,381

Applicant(s)

HUANG ET AL.

Examiner

Jaworski Francis J.

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

The finality of the previous office action has been WITHDRAWN in order to consider a newly uncovered reference, US6558330 to Ayter et al.

Parenthesized numerals following the rejection argument identify the specific claim or claims being addressed.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 – 17 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ayter et al (US6558330, newly of record) in the latter case alone or further in view of Fraser (US6328697).

Ayter et al suggests that the cMUT cavity defined by support electrode 16 and membrane electrode 16 and insulating substrate 12 which comprises the walls of the cMUT well may be partially filled by an area of insulating material 40 which may also be characterized as a 'post' insofar as applicants note per the amendment response filed on July 7, 2006 page 8 top portion that 'area or post' is not constrained to any shape regularity or particular cross-section, and therefore the solid elastomeric or polymer

variant described in col. 3 lines 22 – 33 would be either an area or post, the latter in the sense of 100% fill of the cMUT chamber up to the fractional fill height desired. [An analogy would be that a support post is also a post within tamped ground and therefore occupying 100% of its containment chamber as well in air where it stands isolated with free space surroundment.] In Ayter et al, the stated purpose is electrical isolation; Charge accumulation prevention would inherently follow intrinsic to the nature of plate capacitance insofar as the electrostatic attraction forces would gradate based upon the inwardly arched membrane electrode geometry and be limited by bottoming against this insulation portion 40, and therefore the structure shown by Ayter et al would function to provide both insulation and charge pooling.

In the alternative, if one may argue that claim 1 and additional independent claims are unmet by Ayter et al alone under any interpretation since charge and its manner of accumulation and distribution and factors which affect this are undiscussed, then it would nonetheless have been obvious in view of Fraser Figs 2 and 3 and col. 3 lines 28 – 62 that under routine operational conditions for an ultrasound cMUT, an applied DC bias voltage will create an electrostatic force so as to draw the membrane electrode towards the lower support electrode and therefore charge will concentrate in the diaphragm's center and device sensitivity to an impressed or returning echo AC voltage for (drum vibrational) transmission and reception will increase, albeit without the Fraser improvement proposal, such increasing sensitivity carries risk of contact collapse and shorting. Hence insulation layer 40 by providing a support under the membrane electrode 'roof' will act to limit the membrane deflection under voltage bias

that would otherwise cause the membrane to fully deflect and approach the support electrode with attendant concentration of charge where the plate electrodes are near-touching, and so element 40 would 'minimize the accumulation of charge'. (Claims 1,5/1,6/5/1,7,9/7,10/9/7,15-17).

Ayter et al fabricates both the membrane support portion of electrode 16 (upper) and the support electrode 16 from silicon; Fraser notes that the insulating support such as 16 which forms the periphery of the cMUT chamber or well may be formed of silicon oxide or silicon nitride hence these are evidenced to be conventional cell constituent components when the latter combinational rejection applies. Otherwise the insulation and charge/ion accumulation arguments supra apply. (Claims 2,5/2,6/5/2, 8,9/8,10/9/8).

Noting that the Ayter et al implementation of insulating material 40 may be a partial or a full filling of the chamber (respective col. 3 portions line 35 and 22), in the case of partial filling the support electrode 'carries' the filler whereas in the case of full filling either the membrane or the support electrode may be said to 'carry' the filler in the sense of abutting containment depending on how the device is oriented. Similarly the filler may be said to be 'formed' on the electrode components since the net being that the filler assumes the shape of and abuts one or more of these, the manufacture step(s) being non-limiting on the structure (Claims 3 - 4/1 - 2,11-12/7-8).

In Ayter et al, the durability which is so provided by a filler in its partial or full-fill shape then incorporates into the optimized frequency responses of Fig. 3. (Claim 13/7-8,-14/13/7-8).

Response to Arguments

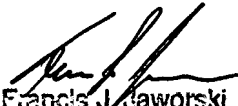
Claims are considered to be in a clear and concise format. However the uncovering and review of Ayter et al has resulted in a reasonable interpretation thereof as a teaching of using a solid partial of full-space filler within the cMUT cell as an area or a post serving to limit membrane electrode travel towards the support electrode under application of bias voltage and/or information excursion voltage at ultrasound frequencies, thereby serving to insulate against contact breakdown and pooling of charge that would otherwise occur on the electrodes in the proximated portion of the drum.

This action is NOT made final however the case should be prepared for final action.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

11/21/07


Francis J. Jaworski
Primary Examiner